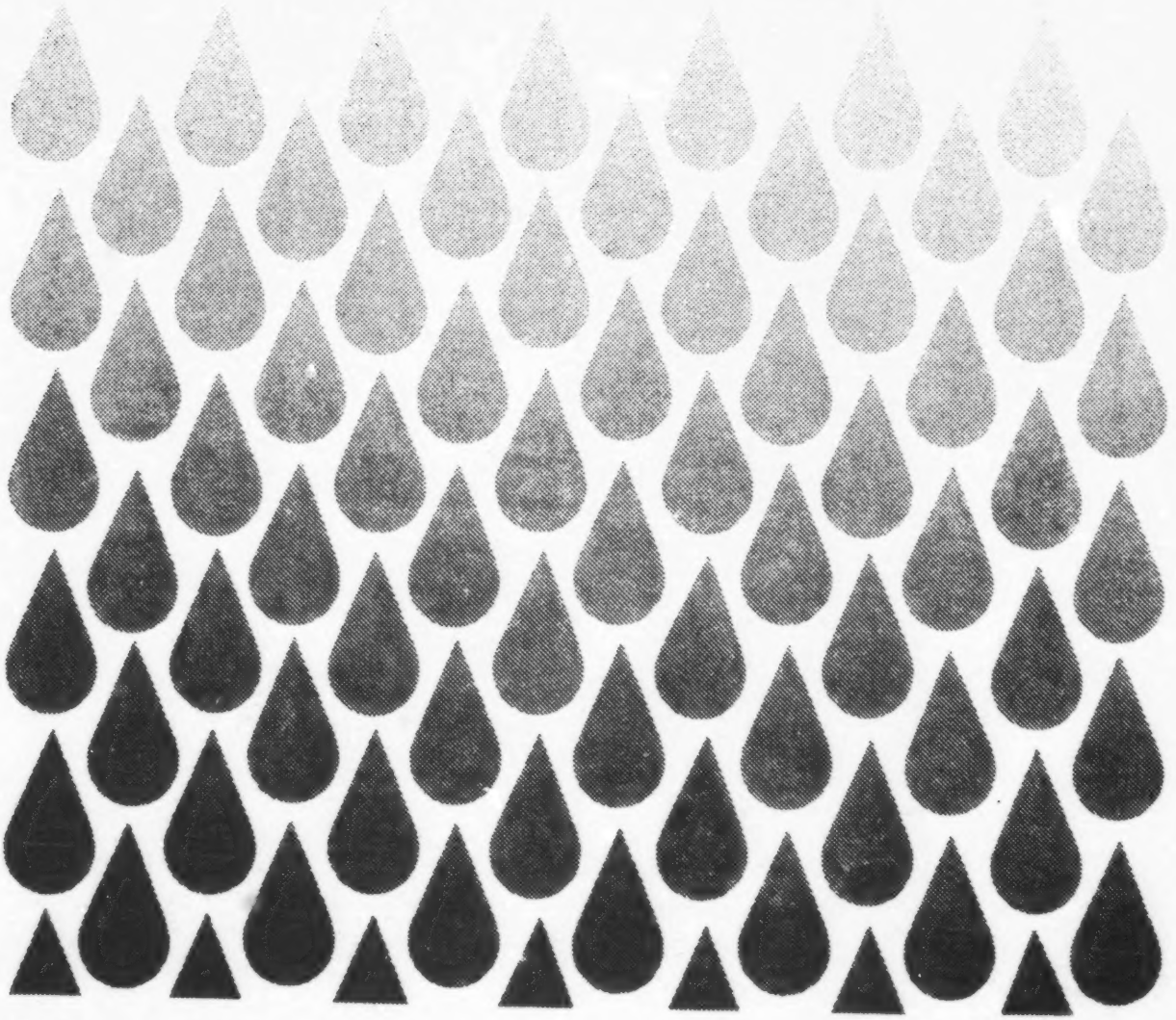
Nova Scotia

Minister's Task Force on Clean Water

INTERIM REPORT

What You Told Us - A Summary of Public Input



Nova Scotia
Department of the Environment

Honourable John G. Leefe
Minister of the Environment

HALIFAX, NOVA SCOTIA
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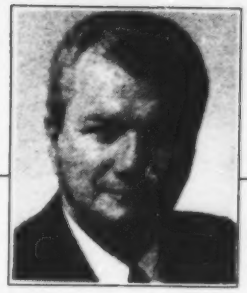
Nova Scotia

Department of the Environment

Office of the Minister



TO CONCERNED NOVA SCOTIANS

Thank you for sharing your many concerns and ideas about water issues with the Task Force in the public meetings held this year throughout the Province.

This summary of your suggestions has proposed many policies and programs. The Task Force would like your response to these new directions and ideas to ensure that the final report will reflect your concerns. The questionnaire and proposed workshops will also give you an additional opportunity for further comment and also allow those who missed the initial public meetings to participate.

It is essential that we hear from as many Nova Scotians as possible before the final report is completed. As I have said before, "water is a touchstone, a marker for judging man's care of the planet."

Thank you again for your contributions. Government cannot do it alone, but together we can aid in development of a provincial water resource management strategy both for our immediate use and implementation, as well as future generations.

Yours sincerely,

John G. Leefe
Minister

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INTRODUCTION

TASK FORCE ON CLEAN WATER: MANDATE

In June, 1989, Honourable John Leefe, Minister of the Nova Scotia Department of the Environment established a Task Force on Clean Water to... "develop a new Water Resource Management Strategy by reviewing and defining policies to manage surface water and groundwater resources for our use and that of future generations."

The Terms of Reference directed the Task Force to examine the following areas of water resource management:

Water Quality

- To ensure adequate water quality.
- To reduce, minimize or prevent pollution from a variety of point source and non-point sources.
- To minimize the effects and damage due to long range transport of air pollutants.

Water and Land Use Planning

- To ensure adequate water quantity.
- To provide appropriate planning and land use mechanisms for use in flood prone areas and to reduce or minimize damage from storm water drainage.
- To encourage the development of municipal water supply watershed management and protection plans and mechanisms to implement them.
- To ensure provincial water resources are protected from erosion and related activities and, where possible, minimize these effects.

Socio-economic Concerns

- To manage and protect the lakes, rivers, wetlands and coastal areas of Nova Scotia so that they can continue to provide economic, aesthetic and environmental benefits.
- To provide for effective recreational fish and game environments.
- To enable socio-economic benefits to accrue to the Province from sound pricing and cost recovery for the use of its water.
- To ensure cost-effective delivery of municipal water supply and pollution control infrastructure.

Institutional Arrangements

- To clarify to Nova Scotians the role of federal, provincial and municipal jurisdiction in the management of water resources.
- To provide for more effective legislation, regulation and administration.
- To enhance the role of academic institutions in Nova Scotia in all aspects of water research and training.

Public Information, Education

- To develop positive public education and media programs for sound water resources stewardship.

The Task Force was asked to review existing information on water resources; to invite written and oral submissions from the public, industries, municipalities, federal and provincial government departments, and agencies with an interest in water; and to examine water management initiatives from other jurisdictions across Canada.

The Minister requested that an interim report be delivered 12 months after the start of the information collection stage. This was presented to the Minister in November 1990. The final report will identify the full scope of water resource issues and problems with recommendations for action and is due in the spring of 1991.

WHERE ARE WE NOW?

Since November of 1989 the Task Force has compiled over 750 issues, recommendations, and statements from individuals and groups. They have resulted from briefing sessions with representatives of government departments, and fourteen public meetings throughout the province.

Over 1700 pages of information have been sorted, condensed and classified into a series of key issues and recommendations suggested by the public.

- Part 1 of this report describes the existing situation with respect to water quality, quantity and management in Nova Scotia.

- Part 2 summarizes what was heard from Nova Scotians about water.

- Part 3 lists the policy and program suggestions extracted from the public meetings and presentations.

Before completing and adding the Task Force conclusions and recommendations, we would like to receive more input from the public. For this reason, policies and programs are presented in questionnaire form to fill in and return. The Task Force would like your response to the suggested new directions and to the new ideas as presented. **Are they on target? Are they complete? Let us know.** These responses will ensure that your concerns will be reflected in the final report.

Workshops to provide a forum for more detailed discussions will be held early in 1991. These will be organized around the following topics:

1. Water Quality and Quantity
2. Water and Land Use Planning
3. Wetlands, Wildlife and Recreation.
4. Services, Pricing and Conservation
5. Research, Data and Monitoring
6. Information and Education.
7. Institutional Requirements.

The input from these sessions will help to finalize policy recommendations. If you are interested in attending one or more of these sessions, please fill out the enclosed form on page 30 and return to the Task Force before January 25, 1991.

PART 1:

STATE OF THE RESOURCE: THE CURRENT SITUATION

OVERVIEW

Nova Scotians use water at home, in businesses and industries, and for recreation. Most of us take clean water for granted. About half of our supply is taken from rivers and lakes, while the other half is drawn from individual wells. The average household uses 150 to 250 gallons of water per day. Only 4 percent is consumed by drinking or cooking; 96 percent is used for all types of waste disposal.

AVERAGE HOUSEHOLD WATER USE

Bathing and personal use	28%
Laundry and dishes	23%
Toilet	45%
Drinking and cooking	4%

Source - Our Fresh Water Resources, Environment Canada, Inland Waters Directorate, 1982.

Water is wasted in industrial processes, and on home appliances and toilets. This reflects the general tendency to consider water as a cheap, readily available resource. Water is usually forgotten until the supply is reduced or cut off due to shortage or contamination.

AVERAGE DAILY WATER CONSUMPTION IN NOVA SCOTIA

User:	Amount (gals/day):
Municipal Water Systems	75,600,000
Individual Wells	30,000,000
Industrial Uses:	
Pulp and Paper	85,000,000
Mining and Manufacturing	8,400,000
Fish Processing (indep. system)	850,000
Meat Packing	840,000
Dairy and Beverages	320,000
Agricultural Uses:	
Stock Watering	1,900,000
Irrigation (3 applications/year)	600,000
Total Daily Water Consumption	191,500,000

Source: Nova Scotia Department of the Environment, Water Resource Services, October 1990.

In Nova Scotia there are over 6700 lakes, many rivers, and significant groundwater resources. Why should Nova Scotians worry about the future of fresh water in the province? There are four main reasons:

- Natural quality of water is rather poor and is degraded further by man-made contaminants.

•The aquatic systems which have natural water cleansing properties have not been properly tested to determine their capacity to absorb contaminants without being degraded or destroyed.

•The management of water resources is fragmented, incomplete and lacks coordination.

•It is expensive to clean up pollution after the fact, and may be difficult at any price. Governments at all levels - federal, provincial and municipal - no longer have money to waste on expenditures which could be reduced or avoided through better planning, management and conservation.

WATER QUALITY

In nature, there is no such thing as pure water. Most of the water in Nova Scotia, on the surface and in the ground, contains dissolved minerals and some contaminants that may reduce its quality. This water may be unsuitable for drinking without treatment.

Some contaminants occur naturally. They come from bogs and swamps, soil, and rocks on the earth's surface and under ground. They include iron and manganese which add colour and affect the taste; hydrogen sulphide which gives an unpleasant rotten egg smell; arsenic which can be poisonous; and radioactive minerals (uranium and radon) which may be a health hazard in certain concentrations.

Water is also affected and degraded by human activities. It is polluted by acid rain, sewage, animal manure, industrial liquid wastes, road salt, pesticides and herbicides.

Many other factors affect water, including silt from land clearing and construction activities, liquids from waste disposal sites, and chemicals which are accidentally or deliberately left on the ground and later dissolved or transported by rainwater.

Many contaminants come from clearly identified sources, called point sources, but others are generated in small amounts from a number of locations that are hard to determine. These are called non-point sources of pollution. Both are very important but non-point sources are more difficult to deal with because there may be hundreds of individual contributions to one general problem.

Many sources of contamination can be traced to land use activities such as construction, forestry, agriculture, and mining. However, the contribution from industry, municipal sewage systems and individual on-site sewage systems is significant.

NATURAL WATER SYSTEMS

Traditionally, it is assumed that surface and groundwater systems can cope with pollutants and will regenerate naturally to yield clean water whenever and wherever it is needed. However, in some parts of the province the burden of pollution has overwhelmed the natural purification mechanisms.

One of the most serious problems comes from sewage disposal systems. The Annapolis River is a good example of an overloaded waterway, but there are other rivers and estuaries around the province which could also be of concern. In addition, some chemicals are being discharged which do not degrade naturally but collect in bottom sediments, and aquatic plants and animals. Heavy metals and some chemicals discharged in industrial effluent are also problems.

Overall, there is little information about the capability of natural waterways to absorb contaminants, yet these continue to be loaded with new sources and types of pollutants.

Wetlands which act as natural water purifiers are being degraded or destroyed. They have typically been considered useless from a land use point of view and many have been filled in to provide land for construction or farming. Wetlands are also critically important in the ecological cycle that supports wildlife populations. They provide protection, feeding

and rearing areas for many animal species which are an integral part of the rich and diverse wildlife of Nova Scotia.

Many wetlands are on flood plains which have been popular places to build over the years because the land is flat and the soil is easy to use. In these locations the natural function of the flood plain has been ignored and the inevitable periodic floods have caused considerable property damage. In order to avoid flooding, developers have often built up the land with fill to raise the level of the property. By reducing the size of the flood plain, this activity often can cause increased up and downstream flood damage.

Interference with natural water flow patterns can also reduce the storage available for water in periods of high rainfall. This results in extended drought conditions and dry periods. This imbalance can also be caused by the destruction of wetlands and the removal of vegetation, both of which retain water and promote the replenishment of groundwater resources.

MANAGEMENT OF WATER RESOURCES

Surface and groundwater is owned by the Province but is not effectively managed by any one provincial department. The provincial departments of Environment, Fisheries, Health and Fitness, Lands and Forests and Municipal Affairs have some direct legislative responsibility. Others such as Agriculture, Mines and Energy, and Transportation affect water through the administration of regulations.

The federal government also has an interest in various aspects of water management, for instance migratory fish, and navigation. Municipalities are responsible for their own water services and sewage treatment plants. In addition, they have a significant influence over the quality of fresh water through the control of land use, but have no formal role or responsibility for water management.

Essentially, responsibilities for water resources are divided and poorly coordinated, even though they are of basic importance to the health of Nova Scotians and to the economic life of the province.

The government departments involved have different interests and responsibilities. Water management in the short term is reduced to solving specific problems rather than acting to protect the resource for the long term.

One area of particular concern is the management of watersheds that provide municipal drinking water supplies. The activities on the land within these watersheds can directly affect the quality of water and the cost of treatment. It is important to prevent activities taking place which could pollute the water supply. In most cases the municipalities drawing the water have little control over the watershed lands and as a result the water suffers from various forms of contamination.

Another problem becoming increasingly clear is the allocation of water among users having differing needs and a different impact on the water. For instance hydro power plant operators and sport fishing interests view water from very different and conflicting points of view. At present there is no clear way to be sure that the legitimate needs of all parties are accommodated.

ECONOMIC FACTORS

One of the more significant costs municipalities have to shoulder is the provision of water and sewage services for their residents. Unfortunately, the service is often poorly managed.

About half of the provincial population is served by municipal water supplies. In many communities the water is not metered and the charge for the water service is often below utility costs. In addition some municipalities supply water that is of inadequate quality but they have not been able to consider improvements.

Similarly, sewage treatment is often poor or even absent, in which case the effluent

frequently contaminates both fresh water and coastal waters where it may degrade potential shellfish areas.

The Task Force has learned that in some municipalities, water and sewage services were installed after well water was contaminated by inadequate on-site sewage disposal systems. Some of these problems could have been avoided by better planning. In other cases, the groundwater quality and /or quantity was poor and a more reliable supply was needed.

In the past there has been lack of cooperation between municipalities about servicing, even though costs might have been reduced and better systems installed.

The present uncoordinated approach to water management has undoubtedly been very expensive for the province and offers little comfort for the conservation of our fresh water resources for the future.

INFORMATION AND EDUCATION

Formal and non-formal education surfaced as issues in the Task Force consultation sessions. There appeared a general sense that better or increased information would be a major step toward resolution of some current water problems, and would ward off difficulties in the future.

Responsibility for increasing the levels of knowledge about water was placed on the shoulders of the schools, property owners, the media, and all levels of government. Most presenters suggested that such responsibility be shared.

Concerns, complaints, recommendations and solutions were offered. Members of the general public recounted difficulty and expressed frustration at gaining access to appropriate sources of information. Some laid the responsibility squarely on the public school system to educate and prepare society to conserve and protect water; others considered the onus to be that of different levels of government.

PART 2:

WHAT YOU TOLD US:
NOVA SCOTIANS' VIEW OF WATER ISSUES

OVERVIEW

The following seven sections provide a summary that reflects the views of Nova Scotians as presented to the Task Force during meetings throughout the province.

1. WATER QUALITY AND QUANTITY

Many people are concerned about the basic state of the province's water resources in terms of its quantity and quality. The concerns extend to surface water and ground water, sources of natural and man-made contamination, and human interference with natural water systems. Many issues stem from human health concerns but fishing, recreational, and conservation interests are also represented.

■ ***KEY STATEMENT:***

Ensure adequate water quality and quantity, reduce and/or prevent pollution.

▸ **Issue\Problem (Groundwater):**

Protect groundwater from pesticides, road salt, agriculture runoff (fertilizers, manure), sewage, and petroleum spills.

Solutions\Recommendations:

- Provide facilities for safe storage of pest control products (pesticides and herbicides).
- Provide planning mechanisms to protect groundwater.
- Do health testing to assess risk from high sodium in aquifers.
- Encourage use of low flush toilets for better functioning on site sewage systems.
- Rank water issues on a scientific basis.
- Sand roads in winter in critical areas to avoid well contamination from road salt.
- Establish standards to sustain high quality for groundwater in urban areas.
- Provide guidelines for every substance that ends up in our water supplies.

▸ **Issue\Problem (Groundwater):**

Determine groundwater quality province-wide.

Solutions\Recommendations:

- Determine extent of natural radioactive and heavy metal contamination in N.S., e.g. uranium and arsenic.
- Classify aquifers by quality for humans, domestic and industrial uses.
- Investigate and determine extent of manmade groundwater pollution.
- Survey well location, type of construction and maintenance in relation to groundwater contamination.
- Provide more water quality testing free of charge by Dept. of Health.
- Identify existing & projected supplies &

capacities for residential use.

►Issue\Problem (Surface Water):

Protect surface water from pollution, e.g. pesticides, acid rain and acid runoff, erosion, sewage, fertilizers, corrosiveness.

Solutions\Recommendations:

- Reduce level of acid rain emission by fighting problem at source (need federal, provincial, and international cooperation).
- Provide greenbelts to edge of water courses.
- Reduce industrial emissions.
- Eliminate all sources of air pollution as soon as possible.
- Locate water supply intake structures properly to avoid or reduce contamination.
- Provide safe storage facilities for pest control products.
- Need controls to eliminate sewage, pesticides, herbicides & road salt.
- Need "biological indicator" approach to monitoring.
- Consider rainwater as a source of supply in areas of poor water quality and quantity.
- Provide oil\dirt traps where stormwater discharges into watercourses.
- Water issues should be determined on a scientific basis.
- Need independent study of Boat Harbour sewage system and upgrading treatment facilities.
- Need health assessment of effects of acid rain and Boat Harbour sewage pollution.
- Recommend investigation of trihalomethanes in all chlorinated drinking water supplies in the province.
- Eliminate raw sewage entering water systems.
- Curtail flow of industrial wastes to bodies of water.
- Determination of standards to sustain water quality in urban areas a prime focus of Task Force.
- Determine quality of lakes and water-ways so impact of urban development can be monitored.
- Local industry be compelled to clean up to improve salmon fishing.
- Prepare guidelines for acceptable levels for every substance that ends up in a water supply.
- Province look at improper use of forest harvest machines on streams and other surface waters.
- Identify areas where surface waters recharge groundwater.
- Identify lakes at high risk for potential pollution.
- Need commitment for next 5 years to reduce acid rain.
- Determine impact of Department of Transportation snow and ice removal on water quality.
- Look at alternatives to road salting.
- Determine whether the effects of "non-point" sources of pollution, such as boating, are being addressed.
- Need to investigate effects of roadside weed spraying and contamination.
- Need to solve the problem of agriculture spills and runoff (hog manure now produced in Annapolis Valley equivalent to sewage

discharge of a city of 250,000 people).

GENERAL STATEMENTS:

- Need to conserve water quality and quantity.
- Concern about acid runoff from slates and resulting fish kills.
- Clear cutting and other forestry practices along rivers are detrimental to our water systems.
- Concerned about the proximity of waste disposal sites to drinking water reservoirs.
- Concerned about stormwater runoff in all municipalities.
- Cleaning up existing pollution very important.

II. WATER AND LAND USE PLANNING

Land use activities directly affect the quality and quantity of water in adjacent waterways. It is clearly recognized that disregard for this relationship has caused many of the water problems experienced around the province. The recommendations put forward by the public have implications for individuals and all three levels of government. They suggest basic changes in the way land and water are managed.

KEY STATEMENT:

Provide planning and land use mechanisms in flood prone areas to reduce and/or prevent damage from stormwater.

Issue\Problem:

Not enough control in flood prone areas.

Solutions\Recommendations:

- Develop Provincial policy for flood plain management.
- Incorporate stormwater management planning into land use planning strategies.
- Provide policies and regulations to protect flood plains from development, infilling and encroachment.

KEY STATEMENT:

Ensure that water resources are protected from erosion effects.

Issue\Problem:

Erosion effects (such as siltation, soil loss, gully formation) deteriorate water quality.

Solutions\Recommendations:

- Examine erosion control methods and technology.
- Erosion management practices should be incorporated into appropriate land and water planning regulations.
- Effective monitoring and enforcement are needed.

GENERAL STATEMENT:

- Soil erosion control measures are cost effective investments for agriculture and forestry.

■ ***KEY STATEMENT:***

Encourage Water Supply and Watershed Management Plans and Implementation Mechanisms

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▸Issue\Problem:

Integrated land use planning systems are not in place to address water issues effectively.

Solutions\Recommendations:

- Prepare a Provincial Land Use Policy as soon as possible on a broad range of land use issues that affect water.
- Province must recognize its responsibility to adopt land use policies to manage water resources effectively.
- Proposed corporate development activities on waterways should require an environmental impact assessment to determine effects on other users.

▸Issue\Problem:

Insufficient watershed management planning.

Solutions\Recommendations:

- Ensure the integrity of Nova Scotia water quality by forming watershed management systems for local and regional areas.
- Promote inter-municipal planning strategies for water supply areas as provided in the Planning Act.
- Create watershed management authorities for each watershed including its saltwater estuary.
- Amend provincial subdivision regulations to make N.S. Environment an approving agency to ensure environmental standards are applied.
- Ensure that proposed new developments are located away from waterways.
- Make comprehensive forest management plans for every water supply watershed in the province.
- Provide joint certificate of approval for sewage disposal systems, wells and roads.
- Provide regulations and guidelines to control land use activities on water supply areas including groundwater recharge areas when provision of high quality water is the prime goal.
- Encourage landowners to leave green belts next to brooks, streams, and rivers and their tributaries.
- Provide a 100 metre buffer zone on both sides of rivers, lakes, wetlands and flood plains to protect them from development and environmental damage.

▸Issue\Problem:

New sources of water will be required.

Solutions\Recommendations:

- The Province and the Municipalities together should examine and acquire or control all existing and potential water supply, watershed lands and well field sites in preparation for future urban growth.
- Future potential water requirements and sources of pollution must be identified.

▸Issue\Problem:

Current approach to the management and protection of water supplies is fragmented

Solutions\Recommendations:

- Coordinate government, private sector and public input for the design, implementation and monitoring of comprehensive water supply area management plans.
- Incorporate broad scope of planning tools into comprehensive management plans for critical water supply watersheds.
- Residents and property owners within watersheds must be involved in the preparation phase of any watershed management plan.
- Land use development should be compatible with the projected use of nearby water resources.
- Adequate monitoring of land use activities should be used in order to prevent adverse effects to water quality.

▸Issue\Problem:

Need to ensure that drinking water remains clean and unpolluted.

Solutions\Recommendations:

- Ownership by municipality of water supply area.
- Designation of the water supply watershed as protected water areas under the Water Act, with or without regulations.
- Implementation of land use controls.
- Provide adequate water treatment.
- Comprehensive water supply watershed management plans are needed.
- Protect and maintain high quality water a complete integrated approach to all aspects of water management must be made.

▸Issue\Problem:

Not enough attention paid to protecting groundwater regime.

Solutions\Recommendations:

- Adequate monitoring of land based activities should be carried out through a watershed authority and by using integrated land use planning.
- Classify aquifers into (1) high quality for human use, (2) intermediate quality for human use after treatment, industrial and agricultural use, and (3) low quality for other uses.
- Classify groundwater contamination as the result of (1) man's activities, (2) natural toxins and (3) improper well construction and location.
- For planning purposes groundwater recharge boundary areas can be considered, in most cases, to be the same as surface water watershed boundaries.

III. WILDLIFE, WETLANDS AND RECREATION

A full range of interests must be considered to allocate water to meet the needs of different users. They include consumptive uses such as home, business and industry, and the non-consumptive uses such as recreation, hydro plants, wildlife and wetlands. In some cases the impact of one user is incompatible with the requirements of others. In these situations mechanisms are needed to resolve conflicts and ensure that sustainable use of water is protected.

■ ***KEY STATEMENT:***

Manage and protect water resources to continue to provide, economic, aesthetic, recreational and environmental benefits. This includes wildlife and wetlands.

▸Issue\Problem:

Economic development of province depends on the sustainable use of water resources. In this issue, the environmental impact on other users must be recognized.

Solutions\Recommendations:

- Recognize adverse effects of dams on upstream and downstream fish and water movement by providing adequate flows and fishways.
- Ensure that water flows from dams and river diversions are maintained for habitat management and other users.
- Proposed river diversions and dams must be evaluated on economic, social and environmental impacts, e.g. integrated resource planning.
- Develop a water management strategy which integrates economic development and environmental protection.

▸Issue\Problem:

Water Resources must be allocated on a fair basis to competing users in order to protect the environment and provide economic benefits to the Province.

Solutions\Recommendations:

- Consider incentive programs for industry and others to conserve water.
- Need comprehensive inventories of the resource to provide basis for a fair allocation of the resource.
- Need holistic approach to maintain clean water.
- Must consider multiple uses of water when allocating water resources.
- Need controls for competing water users.

▸Issue\Problem:

Sewage and its impact on other water users is not being recognized.

Solutions\Recommendations:

- Sewage treatment is needed to improve water quality for streams, rivers and lakes.
- Consider results improved sewage treatment will have on tourist and shellfish areas.

▸Issue\Problem:

Pollution damage caused by soil erosion and siltation from construction sites, forest and agriculture lands on rivers, ponds, lakes, bogs, and wetlands.

Solutions\Recommendations:

- Must consider costs and impact to fish, plants, wildlife and people.
- All projects (major or small) which affect wetlands and flood plains should have environmental impact studies.
- Guidelines, standards and regulations must be enforced to prevent environmental damage.

▸Issue\Problem:

Wildlife habitat is being lost.

Solutions\Recommendations:

- Must have comprehensive land use policies and plans developed using public input and education.
- Existing legislation protecting wildlife habitat and related matters must be strictly enforced, but most important is public education.
- Environmental project funding should be encouraged for fishways, wildlife habitat, river clean-up, from both the private and government sectors.
- Government should consider dedicating funds from license fees for fishing and hunting to wildlife and wetland preservation.
- Storm sewers discharging into wetlands must not contribute contaminants such as silt, oil and sewage.
- Streamside vegetation must be present to provide fish protective cover, shade and insect food.
- Monitoring fish health factors can lead to discovery of environmental problems.

IV. SERVICES, PRICING AND CONSERVATION

Sewer and water servicing is very expensive. Several municipalities are burdened by the cost and feel that funding sources are inadequate. However, there is reluctance to charge users for the full cost of providing the service and to set up funds for improvements to the system. There is also little effort to encourage water conservation, reduce wastage, and share facilities for mutual benefit.

▪KEY STATEMENT:

Ensure that municipal water supply and pollution control services are planned and cost effective. This also includes recommendations for both expenditure and sources of funding.

▸Issue\Problem:

Funding and management of water and waste water supply and treatment facility alternatives need to be examined and upgraded.

Solutions\Recommendations:

- Province should help municipal governments to set rate structures which reflects the real costs of treatment.
- Encourage municipal units to provide joint services on a regional basis.

• Municipalities need policies and financial aid to separate stormwater from domestic waste water.

• Funding assistance needed by municipalities for legal and survey costs when designating protected watersheds.

• Utilities should provide rates that allow them to purchase lands, e.g. watersheds.

• Water, sewage and solid waste systems should be operated as utilities.

• Protection of water resources requires funding - taxes on plumbing, drilling, sanitary supplies could be directed to trust fund so that province could assist municipalities to catch up on problems.

▸Issue\Problem:

Water is not being conserved

Solutions\Recommendations:

• All water delivered to the customer should be metered.

• Standards should be set for municipal water system losses.

• Need increased funding for water quantity measuring stations to provide efficient province-wide monitoring network.

• Include climate change assessment in long range water resource planning. This also requires a risk analysis to determine costs and benefits.

▸Issue\Problem:

Municipalities have been using water utility funds for other purposes than originally intended.

Solutions\Recommendations:

• Set up funds to pay for future treatment facilities.

• Government should not allow municipalities to use surplus funds from their water utility operations for other municipal functions.

▸Issue\Problem:

Current water rate charges are not realistic and should be linked to waste treatment charges.

Solutions\Recommendations:

• Individuals should pay all costs for the resource.

• The quality of water that is put back into a water resource should be as good as or better than the quality when the water was first taken.

• Adopt a provincial pricing policy that recognizes value of resource, cost of supplying it and disposing of it safely after it is used.

• User charges need to reflect economic value and encourage the most efficient use of the resource.

• Improved water quality can be reflected in a higher price for a better product.

V. RESEARCH, DATA AND MONITORING

The existing structure for managing water has several serious shortcomings; in particular, knowledge about the resource and how to resolve problems. This includes an incomplete data base on the quantity and quality of water in different parts of the province; inadequate support for research and information gathering; and few trained operators for treatment plants.

■ ***KEY STATEMENT:***

Identify the need for water research and training in academic institutions and government.

▸Issue\Problem:

Water Resources training at community college and university level is minimal.

Solutions\Recommendations:

- Provide strong support to educational institutions that are training future water managers.

- Government should support research projects in the resolution of water supply and treatment problems-this in turn assists educational programs at university level.

- Strengthen the human resources planning, development, recruitment and training to meet needs of the Nova Scotia Department of the Environment.

▸Issue\Problem:

Decision makers have inadequate access to interpreted research and data on water to allow for timely resolution of water resource management problems.

Solutions\Recommendations:

- Support the Centre for Water Resources Studies in water research at the Technical University of Nova Scotia.

- Continue industry-public-government research programs.

▸Issue\Problem:

Lack of adequate water resources (hydrogeological and hydrological) data to assist in implementing appropriate water, land use policy and control measures.

Solutions\Recommendations:

- Need for more water quality monitoring and inventory data provided on readily accessible basis, e.g. water use, radioactive and heavy mineral contamination, groundwater and surface water quality.

- Need for more water quantity monitoring and inventory data provided on a readily accessible basis, e.g. water use and flows.

- Monitor groundwater around farms and manure storage areas.

- Assess future demand for water quality and quantities province-wide.

- Identify and make an inventory of water pollution sources province-wide.

- Determine assimilative capacities of receiving waters downstream from sewage treatment plants and sources

• Map and identify potential zones of saltwater intrusion into groundwater.

• Importance of basic water monitoring and inventory should be recognized by province in providing adequate funding to determine resource base.

• Develop and implement province-wide methods and standards for monitoring and the collection of basic data.

GENERAL STATEMENTS:

• More information should be gathered on the state of the environment.

• Information should be provided on soil erosion and the use of cover crops.

• Provide data on wet and dry seasons.

• Long-term health (epidemiological) data studies should be carried out in areas of critical concerns, e.g. Whitney Pier/Sydney areas.

VI. INFORMATION AND EDUCATION

The need for better formal and non-formal education surfaced as an important issue in the consultation sessions. There is a general sense that better or increased information would be an important step in resolving some of the current water problems. This would promote stewardship of water resources by the public.

■ KEY STATEMENT:

Develop education and information programs for water resources management stewardship.

►Issues\Problems:

• There is not enough information about water in the science curricula of public schools.

• The public does not have ready access to appropriate information about water, or about contaminants which affect water.

• Residents and community organizations are not being used efficiently in the management of water resources in their areas.

• People are not fully aware of the relationship between water quality and general health.

• The media has a responsibility in the educational process.

Solutions\Recommendations:

• Public school curricula should include water and waste water issues.

• Students should engage in water management processes by involvement through study project work.

• Recognition for water quality enhancement projects should be considered.

• The public should be kept informed, in easily understood language, about water quality issues including standards, procedures, testing, test results, and possible correctional measures.

• There is a need for integration of information between government departments. Strengthened links among government, industry, universities, community organizations, and the media would also promote the spread of information.

• There should be greater involvement of community individuals and groups in the management of water in their jurisdictions.

• People need to be better informed and

educated about the effects of the contaminants of water.

• Improved access to and dissemination of information will assist greatly in the protection and management of water resources.

• Media should be more involved in the educational process regarding water.

• Central information agency could help with the education and spread of information to the public.

• Develop education and media programs for water resources management stewardship.

GENERAL STATEMENTS:

• Education is an important tool in protecting and managing water resources.

• Public school information programs on water resources should also benefit parents, the general public, and communities.

• Financial support is a major concern in the educational process.

• There needs to be extensive interactive consultation among all users of the resource.

• The connection between what goes down the drain and what comes out of the tap is important to public awareness.

VII. INSTITUTIONAL REQUIREMENTS

Many presenters pointed to the need for a full review of legislation and regulations covering water management. Several administrative gaps were identified and recommendations made for how they might be addressed. The suggestions cover the individual roles and interrelationship of different jurisdictions, and the mechanisms that could be adopted to provide effective water management.

■*KEY STATEMENT*:

Clarify jurisdictional roles for water resources management.

►Issue\Problem:

The approach to the management of water resources in Nova Scotia is fragmented. This involves municipal, provincial and federal departments: e.g. Environment (federal and provincial), provincial Health, Municipal Affairs, Forestry and Fisheries.

Solutions\Recommendations:

• Need a regional and local approach for water supply, water and waste water treatment.

• Each region requires a single sewage treatment, monitoring and enforcement authority or agency.

• Should have regional agencies or authorities responsible for setting standards, operating treatment plants, monitoring, enforcement and setting overall land\water management priorities.

• Must be coordinated and cooperative approach to water resource management among provincial departments, e.g. Environment, Fisheries, Forestry, Health and Municipal Affairs.

• Federal-provincial-municipal cooperative water resources agreements be revived and continued.

• Set up an inter-governmental agency or body for watershed management to control, regulate and protect water on a sustainable basis, e.g. rivers, lakes, wetland and water supply areas.

• Use watershed management approach to set objectives for water quality and treatment.

■ ***KEY STATEMENT:***

Provide effective administration, legislation and regulations.

▸Issues\Problems:

• Individuals have difficulty in identifying appropriate government body or agency to discuss water problems.

• Ambiguity exists in the Water Act and in government policy regarding wetlands.

• Legislation, regulation and the administration of water issues are spread over several provincial acts (Water, Environmental Protection, Fisheries, Forestry, Planning and Health Acts).

• Enforcement and penalties for regulations are inadequate.

Solutions\Recommendations:

• Province-wide mechanisms are needed to protect groundwater and restrict development on wetlands.

• Legislation and regulations are needed for use of waters which cross municipal boundaries, particularly for water supply.

• Regulations are needed to allocate and approve distribution and treatment costs and settle disputes over water.

• Regulations are needed on degree of water treatment and monitoring.

• Regulations are needed to deal with existing development in flood-prone areas.

• Ban untreated waste water discharges into rivers, lakes, wetlands and floodplains.

• Incorporate road construction guidelines and controls to protect watersheds.

• Municipalities need support staff with their authority defined by legislation.

• Encourage voluntary approach to water resource planning and monitoring.

• Projects which affect water and land use with watersheds must have an environmental impact assessment. Amend Environmental Assessment Act.

• Pollution caused by negligence should be corrected by mandatory remedial measures. Amend Environmental Protection Act.

• Fish habitat should be considered within the framework of water planning and management. Communicate to the federal government that Section 31 of the Fisheries Act should have appropriate changes.

• Amend the Nova Scotia Special Places Protection Act to include watershed areas.

• Place the burden on pesticide applicators to show that pesticides\herbicides are not harmful to the environment. Amend the Nova Scotia Pest Control Products Act.

• Give municipalities power to make regulations and control erosion and sedimentation. Require N.S. Department of the Environment to approve subdivisions. Amend the Planning Act.

• Allow municipalities to designate watersheds, make regulations and enforce them.

• Define and establish the responsibilities of municipalities and the Department of the Environment with respect to water resources and water supplies.

• Clarify ambiguities in provincial government policy on ownership of wetlands.

• Limit and control forestry operations, use of herbicides and pesticides in watershed areas.

• Regulate and control erosion and sedimentation.

• Amend the Water Act to clarify the section

of legislation which deals with notification, enforcement and compensation for injurious affection.

- Amend the Water Act to allow courts to order reparations.

- Define standards for the control and containment of farm waste.

- Define a provincial policy for managing stormwater drainage.

- Provide for improved standards for the construction of wells and enforcement of regulations, amend the Well Drilling Act.

- Increase maximum penalties for violations of the various Acts and regulations to deter corporate offenders.

- Adopt federal standards for construction materials used in water supply and treatment systems.

- Provide mandatory training of pesticide applicators as well as water supply and wastewater treatment plant operators.

- Legislate a new Water Act with regulations that coordinates and consolidates all aspects of water control now contained in other provincial statutes, e.g. Planning, Health, Fisheries, Forestry, and Municipal Acts.

■ *KEY STATEMENT:*

Examine existing levels of water research and training to determine their adequacy and effectiveness.

▸Issues\Problems:

- *Water Managers will be in short supply in the future.*

- *Training is lacking in water-related subjects at the community college and university level and must be improved.*

- *Programs to train operators of potable water and wastewater treatment plants are inadequate.*

- *Existing level of technology inadequate to provide quick and suitable interpretation of data for use by decision-makers.*

Solutions\Recommendations:

- Department of the Environment should strengthen its human resources planning, development, recruitment, training and retraining to meet projected manpower needs.

- Give strong support to educational institutions that are training future water managers.

- Government support needed for research projects in water supply and treatment. This in turn supports educational programs at the university level.

- Support is essential for the continuation of industry-public-government-type programs.

- Continue and improve support for the Center for Water Resources Studies at the Technical University of Nova Scotia.

- Research into improved databases showing areas of environmental sensitivity could be used as a decision-making tool for implementing land control measures and provincial land use policies.

PART 3:

NEW DIRECTIONS: POLICIES AND PROGRAMS AS SUGGESTED BY NOVA SCOTIANS

The following suggested policies and programs are set out in questionnaire form for your information and further comment. If there are errors, omissions, suggested improvements or ideas, please let us know.

These comments will help plan workshops on key issues, policies and recommendations for the final report of the Task Force (see page 30). Your comments on the policies and programs can be returned in the envelope provided. **PLEASE RETURN THE QUESTIONNAIRE BY JANUARY 25, 1991.**

The Task Force looks forward to your further comments.

YOUR RETURN QUESTIONNAIRE

Please write your comments in the space provided and attach additional sheets if necessary.

POLICIES / PROGRAMS

I. WATER QUALITY\QUANTITY

■ ***KEY STATEMENT:***

Ensure that surface water and groundwater quality meets the needs of all users, e.g. people, plants and animals.

▸Suggested Policies\Programs (Groundwater):

• Provide management mechanisms to protect groundwater from man-made contaminants.

•Develop adequate programs to assess groundwater resource quality and quantity province-wide.

▸Suggested Policies\Programs (Surface Water):

• Provide management mechanisms to protect surface water from contamination.

• Develop adequate programs to assess surface water resource quality and quantity province-wide. Future problems such as trihalomethanes and Zebra mussels may occur.

▸Suggested Policies\Programs (Surface and Groundwater):

• Develop and adopt provincial sustainable water quality goals and standards.

COMMENTS

POLICIES/PROGRAMS

II. WATER RESOURCE AND LAND USE PLANNING

■ ***KEY STATEMENT:***

Prevent or reduce damage from stormwater by providing planning and control mechanisms for flood-prone areas.

▸Suggested Policies\Programs:

• Protect floodplains from infilling, encroachment and development.

• Discourage investment in areas that are at risk from flooding.

• Incorporate stormwater management, erosion and sediment controls in municipal and provincial land use strategies and controls.

■ ***KEY STATEMENT:***

Encourage the development of water supply watershed management plans and implementation mechanisms.

▸Suggested Policies\Programs

• Adopt a systematic watershed planning and management approach to land use and environmental management.

• Monitor land use activities to prevent adverse effects on water quality.

COMMENTS

POLICIES/PROGRAMS

- Ensure that provincial land use policies and planning strategies recognize, support and protect water resources.

- Develop inter-regional and inter-municipal planning strategies as set out in the Planning Act.

- Amend provincial subdivision regulations to be sure that environmental standards are addressed early in the approval process.

- Provide mandatory greenbelts next to all provincial watercourses.

- Identify the requirements for future water supplies and sources.

- Identify existing and possible future pollution sources.

III. WETLANDS, WILDLIFE, AND RECREATION

■ ***KEY STATEMENT***

Ensure that water resources are planned, managed and protected to accommodate all water uses to provide economic and environmental benefits.

▸**Suggested Policies\Programs:**

- Support a sustainable development strategy for water management which integrates economic development and environmental protection.

COMMENTS

POLICIES/PROGRAMS

- Develop mechanisms for allocating water resources among competing users.

- Require that treatment and discharge of sewage be compatible with the use of the receiving waters.

- Protect wetlands, wildlife habitat, ponds, rivers and lakes from the pollution effects of soil erosion and silt.

- Clarify the ownership of wetlands.

IV. SERVICES, PRICING AND CONSERVATION

■ ***KEY STATEMENT:***

Ensure that municipal water supply and pollution control services are planned, appropriately priced and cost effective, and meet future needs.

▸Suggested Policies\Programs

- Examine, and adopt where appropriate, alternative means of funding and management of water supply and pollution control facilities, eg. Provincial-federal- municipal participation, rate structures, joint regional services.

- Adopt effective metering of water supplied and used.

- Adopt measures for conservation and reduction of water system losses province-wide.

COMMENTS

POLICIES/PROGRAMS

- Sinking funds for future facilities should be set by municipal water utilities.

- Municipal water utilities should keep surplus funds for future designated uses.

- Reflect the complete cost for the development and use of the resource in water rates.

V. RESEARCH DATA AND MONITORING

■ ***KEY STATEMENT:***

Ensure that needs for water research, data base development and training are identified and addressed.

▸Suggested Policies\Programs:

- Provide more support for water resource research, e.g. university, industry and government.

- Increase inventory and monitoring of water quality and quantity in priority areas.

- Provide effective delivery and interpretation of data results.

- Encourage effective water resource training at the community college and university level, e.g. certification for water and wastewater technicians, water managers and planners.

COMMENTS

POLICIES/PROGRAMS

VI. EDUCATION AND INFORMATION

■ ***KEY STATEMENT:***

Develop education and media programs for water resources management.

▸Suggested Policies\Programs:

- Provide through the public school system more information about water and waste water issues.

- Ensure that the public becomes better informed about water and contaminants which affect water supplies.

- Inform and urge residents and community organizations to participate in the efficient management of water in their watershed areas.

- Encourage media to assume a responsibility in the educational process.

- Create a central information agency to assist in the education process and to provide information to the public quickly and effectively.

- Enhance water and waste water information programs by providing additional financial support.

- Establish a system of awards for students and other individuals, businesses and municipalities for special water quality enhancement projects.

COMMENTS

POLICIES/PROGRAMS

COMMENTS

- Urge the Department of Health to provide well and surface water quality reports promptly and in a readily understandable format.

- Provide a province-wide program of public education to address the danger of cross - connections in domestic water and sewage systems.

- Provide a mechanism for the public to obtain good information concerning commercial water softeners, filters and other water treatment equipment offered to the public.

- Institute and support a province-wide water conservation program and encourage it through an annual science-fair type program in the school system.

VII. INSTITUTIONAL ARRANGEMENTS

■ ***KEY STATEMENT:***

Ensure that jurisdictional roles and mechanisms for effective water resources management are clearly identified and assigned.

►Suggested Policies\Programs:

- Set up an Intergovernmental Committee on Water Resource Management among municipal, provincial and federal governments.

POLICIES/PROGRAMS

- Provide mechanisms to form regional management agencies, to allow local decision and action, e.g. water supply protection, water treatment and wastewater.

- Amend legislation to give water resource management agencies or advisory groups the legal mechanisms to operate in a coordinated and effective manner, e.g. Environmental Protection, Environmental Assessment, Health, Special Places, Pest Control Products, Water, Well Drilling and Planning Acts.

- Watershed management agencies should include representatives from local stakeholder groups, municipal and provincial governments.

- Prepare long-range strategic plans to detail water supply inventories, demand forecasts, minimum standards for provision of services, pricing structures and responsibilities of governments.

- Give elected representatives and community individuals and groups ready access to information needed to make sound water resource management decisions.

- Set up a "One-stop Shopping Agency" to provide the public with ready access to a coordinated water information and approval process.

- Establish a lead role for one provincial department or agency to provide direction and coordination for water resource management.

COMMENTS

GENERAL COMMENTS:

ADDITIONAL CONCERNS:

YOUR THOUGHTS ON THE FUTURE OF WATER RESOURCES:

PLEASE RETURN QUESTIONNAIRE BY JANUARY 25, 1991, IN THE ENVELOPE PROVIDED.

Name:.....

Address:.....

Phone:..... Date:.....

WORKSHOPS ON WATER ISSUES

I am interested in attending a workshop on water resource issues, policy/programs. I would prefer the following topic(s): [please indicate one or more areas of interest]. These topics will be discussed at the workshop.

1. Water Quality and Quantity [ ]

2. Water and Land Use Planning [ ]

3. Wildlife, Wetlands and Recreation [ ]

4. Services, Pricing and Conservation [ ]

5. Research, Data and Monitoring [ ]

6. Information and Education [ ]

7. Institutional Requirements [ ]

Name.....
Group Affiliation (if any).....
Address.....
.....
.....
Phone.....

Return Address:

Minister's Task Force on Clean Water
Box 2107 Halifax
Nova Scotia, B3J 3B7
(902)424-5206 or 424-6345
Fax: 424-0501

Please return by January 25, 1991.

Check first and second choices for proposed workshop locations:

Sydney [ ]
Truro [ ]
Halifax [ ]
Bridgewater [ ]
Middleton [ ]
Yarmouth [ ]

You will be notified of final workshop dates and places.

APPENDIX I

TASK FORCE MEMBERS

CO-CHAIRS:

Anne Muecke
Douglas Carter

COORDINATION:

John F. Jones (Coordinator)
Nova Scotia Department of the Environment

Gary S. Porter (Research Assistant)
Nova Scotia Department of the Environment

MEMBERS:

James Harrison
Richard Huggard
Katharine Rice
Lester Settle
John Theakston
Joseph Van Buskirk
Donald Waller
Armand Wigglesworth

CONTACT:

If you have any questions or require additional information, please contact:

Minister's Task Force on Clean Water
P.O. Box 2107
Halifax, Nova Scotia
B3J 3B7
(902) 424-5206 or 424-6345
Fax No.: 424-0501

APPENDIX II

DATES AND LOCATIONS OF PUBLIC MEETINGS

1. Tuesday, April 17, 1990	Halifax - Keddy's Hotel, Atlantic Room
2. Monday, April 23	New Glasgow Fire Hall
3. Monday, April 30	Kentville - Kings County Council Chambers
4. Tuesday, May 1	Middleton Fire Hall
5. Monday, May 14	Port Hawkesbury - Wandlyn Inn, Hawkesbury Room
6. Tuesday, May 15	Sydney City Council Chambers
7. Tuesday, May 22	Truro - Keddy's Convention Center
8. Wednesday, May 23	Amherst - Wandlyn Inn, Cumberland II Room
9. Wednesday, June 13	Yarmouth - Rodds Grand Hotel, Shelburne Room
10. Thursday, June 14	Liverpool - Lanes Privateer Inn, 1798 Dining Room
11. Tuesday, June 19	Bridgewater - Wandlyn Inn, Chart Room
12. Wednesday, June 20	Bedford - Lebrun Center
13. Monday, June 25	Musquodoboit Harbour - Gaetz Brook Junior High School
14. Tuesday, June 26	Dartmouth Library - Multipurpose Room

APPENDIX III

LIST OF PRESENTERS & PARTICIPANTS

Don Ambler	Inland Waters Directorate, Environment Canada, Dartmouth.
Jim Ansems	Berwick, Kings Co.
Doug Archibald	Shubenacadie River\Grand Lake Watershed Advisory Bd.
Sylvester Atkinson	Mayor, Town of Middleton, Middleton.
Bill Bailey	N.S. Dept. of Health and Fitness, Sydney.
Miles Barss	City of Halifax.
Hardy Beviss	Mayor, Town of Bridgetown, Bridgetown.
James Bingley	N.S. Dept. of Mines and Energy, Halifax.
Don Breen	Scott Maritimes, New Glasgow, Pic. Co.
Creighton Brisco	N.S. Dept. of Environment, Halifax.
Blair Brown	Liverpool.
Ernie Boliver	Public Service Commission, Councillor, Bridgewater.
Merrit Butcher	Kings County Trapper's Council, Wolfville.
Andy Cameron	N.S. Dept. of Environment, Halifax.
Peter Casey	N. S. Dept. of Health and Fitness, Halifax.
Robert Christie	Citizens Against Pollution, Pictou, Pic. Co.
City of Halifax	City Council of Halifax, Halifax.
Norval Collins	Community Planning Association of Canada, Halifax.
Jeff Conrad	Aquaculture Association of Nova Scotia, Halifax.
Scott Cook	Kings County Wildlife Association, Wolfville.
Diane Coombs	Councillor, Municipality of the County of Queens.
Ed Colp	N.S. Dept. of Transportation and Communications, Halifax.
Frank Cruickshanks	Inland Waters Directorate, Environment Canada, Dartmouth.
Mary Daley	Mayor, Town of Westville, Westville, Pic. Co.
Dave Darrow	N.S. Dept. of Municipal Affairs, Halifax.
Floyd Day	Eastern Shore Wilderness Association, Tangier, Hfx. Co.
Barry Diamond	N.S. Dept. of Lands and Forests, Kentville.
Derek Doyle	Manitoba Department of Natural Resources, Winnipeg.
Tony Duke	N.S. Dept. of Lands and Forests, Truro.
Derm English	Nova Scotia Federation of Agriculture.
Catherine Enright	N.S. Dept. of Fisheries, Halifax.
Andrew Faulkner	Municipality of the County of Queens , Liverpool.
Frank Fawson	Halifax.
Steve Fenety	Inland Waters Directorate, Environment Canada, Dartmouth.
Harry Ferguson	Councillor, Municipality of the County of Pictou, Pic. Co.
Doug Foster	Municipality of County of Cape Breton, Sydney.
Knowle Francis	Chief, Afton Band, Afton, Pic. Co.
Roddy Francis	Chief, Pictou Landing Indian Reserve, Pic. Co.
Bill Gates	General Manager, Halifax Water Commission, Halifax.
Jim Goit	N.S. Dept. of Agriculture and Marketing, Truro.
Peter Gouthrou	Sydney.
Andy Gillis	Mirror and Examiner, Middleton.
Dave Gilroy	Clerk Treasurer, Town of Truro, Truro.
Allan Glover	Ducks Unlimited, Amherst.
Dan Graham	N.S. Dept. of Lands and Forests, Halifax.
Kate Graves	Halifax.

Shae Griffiths	Clean Annapolis River Project, Middleton.
David Gruchy	Town of Truro, Truro.
Judy Guernsey	Brookside Homeowners Association, Brookside, Halifax Co.
Krista Harding	Treasurer, Town of Liverpool, Liverpool.
Bill Hart	Technical University of Nova Scotia, Halifax.
Gordon Helm	Cumberland Co. Development Authority, Amherst.
John Higgins	N.S. Dept. of Agriculture and Marketing, Truro.
Brad Hodgins	Municipality of the District of East Hants, Shubenacadie.
D.A. Howard	D.A. Howard Consultants, Halifax.
Jens Jenson	Cumberland District Planning Commission, Amherst.
Bruce Johnson	Lake Major Watershed Advisory Bd., Lake Major, Hfx. Co.
W.C. Johnston	Mahone Bay, Lun. Co.
John Jones	Canada-Nova Scotia Flood Damage Program, NSDOE, Hfx.
Steve Kirincich	Councillor, Town of Stellarton, Stellarton, Pic. Co.
Jack Kyte	Scott Maritimes, Abercrombie, Pic. Co.
Lee Lewis	Lake Major Watershed Advisory Board, Dartmouth.
Michael Langman	N.S. Dept. of Agriculture and Marketing, Truro.
Ron Lane	Mayor, Town of Liverpool, Liverpool, Queens Co.
Victor Lee	Canexel, East River, Lun. Co.
Chang Lin	N.S. Dept. of the Environment, Halifax.
Gerald Livingston	Port Hawkesbury.
Richard Lord	Bridgewater Public Service Commission, Bridgewater.
Bob Luxemborg	Tusket River Environmental Protection Agency, Yar. Co.
Joe MacCarthy	Halifax Water Commission, Halifax.
Robert MacCharles	Morrison Beatty Consultants, Sydney.
Kevin MacDonald	City of Sydney, Sydney.
Ed MacDonald	Nova Scotia Division Canadian Manufacturers.
Ed MacDonald	Warden, Mun. of the County of Inverness, Port Hood.
Jamie MacDonald	Nova Scotia Well Drillers Association, Sydney.
Shawn MacDonald	Councillor, Town of New Glasgow, New Glasgow.
A.J. MacDougall	Councillor, Mun. Co. of Inverness, Port Hood.
Gary MacIsaac	Clerk Treasurer, Town of Mulgrave, Mulgrave.
Doug MacLean	Halifax Water Commission, Halifax.
Margaret MacLean	Wycocomagh Development Commission, Wycocomagh.
Lincoln MacLeod	N.S. Dept. of Fisheries, Halifax.
Paul MacNeil	Town of Kentville, Kentville.
Shalom Mandaville	Sackville Rivers Advisory Board, Sackville.
Audrey Manzer	Dartmouth Lakes Advisory Board, Dartmouth.
Bruno Marccochio	C.B. Coalition for Environmental Protection, Sydney.
A. Maroun	University College of Cape Breton, Sydney.
Lawrence Mawhinney	Mayor, Town of Lunenburg, Lunenburg.
Michael McAdam	Cobequid Salmon Association, Truro.
Mike McGill	Town of Truro, Truro.
Curtis McIntyre	Halifax.
Lance Makmillan	Caledonia, Queens Co.
Bill MacWilliam	Councillor, Mun. of the Co. of Pictou , East River, Pic. Co.
Richard Meister	N.S. Dept. of Lands and Forests, Halifax.
Richard Michaud	N.S. Dept. of Lands and Forests, Truro.
Denis Moerman	N.S. Dept. of Agriculture and Marketing, Truro.
Pat Monk	Halifax Water Commission, Pockwock.
Andy Montgomery	N.S. Deputy Minister's Land Use Policy Committee, Halifax.
George Moore	Councillor, Town of Middleton, Middleton.
David Morantz	Department of Fisheries and Oceans Canada, Halifax.
Murray Morash	N.S. Dept. of Transportation and Communications, Halifax.
Kate Moir	N.S. Dept. of Municipal Affairs, Halifax.
Angus Murphy	Eastern Shore Wilderness Assoc. Tangier, Halifax Co.

Danny Murray	N.S. Department of Mines and Energy, Halifax.
Jim Mustard	Piper's Glen, S.W. Margaree, Inverness Co.
Andy Nicholas	Confederacy of Mainland Micmacs, Truro.
Mil Nickerson	Tusket River Environmental Protection Association.
Ken O'Brien	N.S. Dept. of Transportation and Communications, Halifax.
Andrew Paton	N.S. Dept. of Municipal Affairs, Halifax.
Ron Patterson	Town of Amherst, Amherst.
Gwen Phillips	Councillor, Town of Wolfville, Wolfville.
Armand Pinard	Deputy Minister, N.S. Dept. of Environment, Halifax.
Andy Pittman	Sydney, C. B.
Ben Pittman	Town of Amherst, Amherst.
Gerald Porter	N.S. Dept. of Environment, Halifax.
Jim Purdy	Tusket River Environmental Protection Association, Yar. Co.
Carl Purcell	Nova Scotia Salmon Association, Halifax.
Gary Rankin	Clerk Treasurer, Town of Westville, Westville.
Walter Reagan	Sackville Rivers Association, Bedford.
K.L. Redden	Municipality of Kings County, Kentville.
Don Reid	N.S. Dept. of Health and Fitness, Truro.
Haldane Reynolds	Councillor, Town of Truro, Truro.
Gary Rice	Nova Scotia Power Corporation, Halifax.
Bill Richards	Environment Canada - Atmospheric Environment Service.
Joan Ridday	Kings Environmental Group, Wolfville.
Christine Ritchie	Halifax.
R.A. Robertson	N.S. Board of Public Utilities Commissioner, Halifax.
Hugh Ross	Stora Forest Industries, Port Hawkesbury.
Robert Rowe	Aylesford, Kings County.
Paul Rudderham	Rudderham's Well Drilling, Sydney.
Basil Ryan	Councillor, Town of Mulgrave, Mulgrave.
Barry Sabean	N.S. Dept. of Lands and Forests, Kentville.
Conrad Sarty	Dartmouth Water Utility, City of Dartmouth, Dartmouth.
Bill Saunders	Chairman, Petite Rivière Advisory Group, Bridgewater.
Peter Shacklock	Portuguese Cove, Halifax Co.
Kenny Silver	Nova Scotia Salmon Association, Halifax.
Ron Simpson	N.S. Dept. of Municipal Affairs, Halifax.
Graham Smith	Brookside Homeowners Association, Brookside, Halifax Co.
Raymond Snair	N.S. Dept. of Transportation and Communications, Halifax.
Horst Soehl	Cloverdale, Colchester County.
D.M. Soulis	Sec. Wycocomagh Development Com., Whycocomagh.
Anna Steele	Marion Bridge, Cape Breton Co.
Walter Stevens	Councillor, Town of Windsor, Windsor.
Tom Taylor	Annapolis Valley Affiliated Boards of Trade, Middleton.
Lou Thomas	Bridgewater, Lunenburg Co.
Ian Travers	Environment Protection Serv., Environment Canada, Halifax.
Roy Turner	Town of Liverpool, Liverpool.
Eugene Veniotte	N.S. Well Drilling Advisory Board, Northfield, Lun. Co.
John Veniot	Canadian Manufacturers Association, Halifax.
Jim Vollmershausen	Environment Canada, Dir. Gen. Atlantic Region, Halifax.
Jack Von Roestel	N.S. Dept. of Agriculture and Marketing, Kentville.
Walton Watt	Dept. of Fisheries and Oceans Canada, Halifax.
Anthony Weagle	South Brookfield, Queens Co.
Brenda White	Sydney Well Drilling Company, Sydney.
Armand Wigglesworth	Port Mouton, Queens Co.
Ellinor Williams	N.S. Deputy Minister's Land Use Policy Committee, Halifax.
John Woods	Councillor, City of Dartmouth.
Harlan Wyand	Bridgewater Public Service Commission, Bridgewater.

GLOSSARY

ACID DRAINAGE	A process which occurs naturally or can be man induced by the interaction of acidic compounds in water with vegetation, soil and bedrock (slate), resulting in acid runoff which can alter the chemical quality in a receiving body of water.
ACID RAIN	Rain water that has been contaminated with chemicals introduced into the atmosphere through industrial, automobile, and other emissions causing the acidity to be increased from that of unaffected rain water.
AQUIFER	Earth materials (rocks, sand, gravel) that transmit enough water to supply a well or spring.
FLOODPLAIN	The relatively flat or lowland area adjoining a river, stream, watercourse, lake, ocean, or other body of standing water, which has been or may be covered temporarily with floodwater during storms of specified frequency.
GROUNDWATER	All subsurface or underground water that is distinct from surface water. Usually, groundwater is obtained from a well or spring.
HYDROGEOLOGY	The science that deals with subsurface waters and related geologic aspects of surface waters.
HYDROLOGY	The science that relates to the study of the water of the earth, including its environmental and economic aspects.
PEST	Any plant, animal, or organic function of a plant or animal which may be noxious, injurious, or troublesome.
PEST CONTROL PRODUCT	Any substance or mixture of substances which directly or indirectly prevent, destroy, repel or mitigate the damage caused by any pest.
STORMWATER	Water which runs off the land during and after rainfall.
TRIHALOMETHANES	Organic compounds occurring in water as a reaction to the use of chlorine for disinfection. The guidelines for Canadian Drinking Water Quality specify maximum allowable concentrations of trihalomethanes, however most Canadian drinking water supplies contain negligible amounts of the substances.
WASTEWATER	Industrial, municipal, and domestic effluent which includes sewage, wash water, and process water.
WATERCOURSE	A natural, well defined channel produced entirely or in part by intermittent or continuously flowing water.
WATERSHED	The area drained by, or contributing water to a stream, lake, or other body of water.
WATERSHED MANAGEMENT	Administration and control of all of the resources in a watershed for the production of water, including the control of water quality, stream flow, and floods.